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Sustaining Life in the Oceans: Meeting the Challenge of Development

Oceans have historically been both barriers and bridges between nations. They have provided natural routes for exploration, communication, transportation and trade. Covering about 70 per cent of the earth's surface, they also play a vital role in the planet's complex climate and energy systems.

Some of the most diverse, productive and fragile ecosystems are found in areas where the land meets the sea. Coastal zones have long been a magnet for human activities: the first human settlements developed along waterways and coastlines, and today six out of every ten people live within 60 kilometres of the sea.

When world leaders meet in Rio de Janeiro, Brazil, in June 1992 for the UN Conference on Environment and Development (UNCED), the sustainable development and management of marine environments will be high on the agenda.

Lungs of the Planet or Global Rubbish Dump?

People have long used the ocean in a multitude of ways—to obtain food, for recreation and as a bottomless rubbish dump. In many areas, dumping has the upper hand: some oceans are already "dead" or dying as sewage robs the water of oxygen, and chemicals poison the fish. While the number of people living in coastal regions steadily increases, the waters become less able to support life—human or otherwise.

The Conference, known as the Earth Summit, will attempt to devise environmentally sound development practices that will ensure the sustainable management of global marine and coastal resources. It will also evaluate agreements which have already been negotiated by the United Nations and will suggest ways in which sustainable development of the oceans can be further improved.

Effects of Land-Based Pollution

Most damage to coastal areas is caused by human activities on land, often in cities hundreds of miles inland. Smokestacks billow pollutants which are carried by winds and dropped over the ocean. Industrial wastes and municipal sewage are discharged into rivers and flow to the sea. Pesticides and agricultural fertilizers wash off the land; together with oil from vehicles and salt from roadways, they eventually find their way to the ocean, killing fish and contaminating food eaten by humans.

Companies and Governments dump sludge and toxic wastes offshore in the belief that the ocean's self-cleaning mechanism will eliminate health hazards. Most of these poisons remain in coastal waters; they are particularly damaging in poorly flushed areas such as the Black Sea, the Mediterranean and other semi-enclosed waters.

In the Mediterranean, land-based pollutants can persist in the water for 80 years before being washed out through the Strait of Gibraltar. In October 1991, the UN Environment Programme (UNEP) organized a meeting of the States which had signed the 1976 Convention for the Protection of the Mediterranean Sea against Pollution. Participants agreed to take

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further steps to stop the dumping of solid wastes, pesticides, radioactive substances and micro-organisms into the sea.

The discharge of wastes into open seas is also a problem. On the coast of the Pacific Ocean in the United States, surfers have begun to suffer from a variety of illnesses and diseases traced to micro-organisms in the waste from paper mills and industrial sites several miles away.

In an effort to ensure the sustainable development of coastal regions, representatives at the Earth Summit are expected to focus on the 1985 Montreal Guidelines, a 19-point check-list of already accepted measures for trying to stop pollution where it starts. The Guidelines—negotiated under the auspices of UNEP—seek more effective monitoring and assessment of the environmental impact of human activities, as well as ways to determine liability and compensation for damages.

Governments still need to establish acceptable levels for land-based pollutants and target dates for achieving those levels. Guidelines might include, for example, how much and what type of chemicals used to treat pulp in paper mills could be pumped into a river without harming the life in it or people around it.

Ways also must be found to control the production of "non-point" pollutants, such as toxic wastes in soil run-off. Here the exact activity causing the problem is not always easily identifiable. Control of "non-point" pollutants will involve changing practices in water and waste management, transport, mining and agriculture. Alternatives need to be found to the toxic pesticides which remain in the soil, seep into rivers and streams, and ultimately enter the food chain where they are absorbed by human beings. Substitutes might include biological and "organic" materials.

The disposal of sewage is a problem in many areas of the world—North and South alike. Whether poured untreated directly from the shore or piped half a mile out to sea where it is less visible, raw sewage contains bacteria, viruses, fungi and protozoa which cause ear, skin and gastro-intestinal infections, as well as cholera and hepatitis. They also contaminate shellfish. Preventing this problem is often expensive: sewage-treatment facilities must be built and carefully located in order to avoid polluting local water supplies, fisheries and other resources.

Economics and the Marine Environment

The tourism industry illustrates the tensions underlying environmentally sustainable development. Unless close attention is paid to how natural resources are used, environmental degradation will drive away tourists. Jobs and foreign exchange needed for development will be lost. But tourist facilities often have serious environmental impacts. Resorts built along coasts destroy natural barriers to high seas and winds; land bulldozed and cleared for construction is left vulnerable to erosion. Loose soil is washed into the sea, where it chokes coral growing in offshore waters.

In the Caribbean and Pacific, coral reefs that attract tourists are being "mined" for building materials, plundered by divers and bleached by high water temperatures caused by human activities. In the Balearic Islands, the demand for fresh water has drawn sea water into the aquifers. Integrated coastal-management planning would seek to accommodate some of these competing interests. Some carefully selected areas would be set aside and protected.

Protecting Biological Diversity

Coastal regions are biologically among the richest and most diverse in the world. They are nurseries for innumerable species of plants and wildlife and home to 85 per cent of the world's fish.

About one third of all fish species live in coral reefs found near coasts—the "tropical forests of the oceans". Mangrove swamps and other coastal wetlands are almost as rich. Beaches are also incubators: in May each year, a million horseshoe crabs lay eggs along Delaware Bay in the United States. Some become food for migratory birds on their trips along the Arctic flyway.

Some coastal areas, such as Australia's Great Barrier Reef, are protected as national parks, but criteria for designating, protecting and managing vulnerable coastal and oceanic habitats still need to be developed.

Changing Human Activities at Sea

On the high seas, conventions under the jurisdiction of the UN's International Maritime Organization regulate the activities of commercial vessels, which often produce fuel slicks and dump sewage and garbage overboard along major shipping lanes.

Port Disposal Facilities. Pollution of the marine environment increases closer to shore. Ships enter ports that do not have facilities to collect the garbage, fuel-oil sludge, lubricants and oil-tainted water ballast they carry after long journeys.

Providing adequate port facilities is expensive. Requirements vary with the type of pollutant, the size of the port and the type and size of ships using it. Sludge and lubricants need some processing, while the equipment needed to collect and fully treat large amounts of ballast water from oil tankers is more complex. For this, storage tanks, treatment plants and underwater pipelines to remove bilge water from berth to shore are needed. High port fees to cover the construction and use of disposal facilities may result in ships dumping the waste before reaching port.

Offshore Oil Drilling. A major threat to the marine environment is the offshore drilling of oil, which produces mud containing benzine, sodium and other contaminants. Both water and mud wash up on shore and seep into coastal wetlands with the tides.

Disposal of Hazardous Wastes. The transport of toxic and other dangerous cargoes is increasing. The world's chemical-tanker fleet has doubled in the last ten years. Other even more hazardous products are carried in container ships. Neither type of vessel is specifically covered at present by United Nations regulations.

Dumping of Industrial Wastes. Some substances, such as uncontaminated dredged materials, are considered safe to dump at sea. Others, such as sewage sludge, are not. More care must be taken in the selection of dump sites, and more attention given to the development of recycling techniques and systematic monitoring programmes. Methods will also have to be found for preventing the incineration of waste at sea.

Sustaining Living Marine Resources

Half of the world's population depends on fish for its main source of food; in Asia, one billion people depend on fish for all the animal protein in their diet. However, overfishing is an almost universal problem, and the global supply of fish is shrinking fast. In many places, entire species of fish once plentiful are no longer found.

The UN Convention on the Law of the Sea provides for States to control all marine resources within a 200-mile offshore zone. Combined, these zones contain 85 per cent of the world's fishing grounds. Each State determines what the "total allowable catch" is for each type of fish, estimates how much it can catch itself and allows others access to the rest.

There is, however, no agreed formula for a "maximum sustainable yield", and Governments of coastal States are reaping large profits from license fees levied on foreign fishing fleets which use sophisticated technology to exploit fishing grounds.

For effective management of marine resources, the problems caused by large-scale commercial fishing will have to be addressed. These include the loss of a sustainable livelihood for local communities and the need to ensure that all species of fish survive the onslaught. Without the latter, the seas will be empty of fish; both commercial enterprises and local peoples dependent on the catch will suffer.

Local fishing communities have long lived in harmony with the environment, producing food for themselves and for towns inland. Women have had key economic roles in these activities: in Sierra Leone, men fish and women process and sell the catch; in Portugal, until the introduction of large-scale fisheries and agribusiness, women were productive workers in household-based fisheries, which gave them economic autonomy and authority in the community. Deprived of traditional means of sustenance, women have become increasingly dependent on waged employment—poorly paid and not always available—and on the consumption of manufactured goods. Where child care and run-

ning the household were an integral part of daily activities, women now take on paid work in addition to hours worked in the home.

National fishing tends increasingly to be dominated by catches for export to earn foreign exchange rather than to provide food for local people. Small-scale fishing-people are being squeezed out of the competition. At the Summit, Governments will emphasize the importance of fishing in trade and economic development. They are also considering ways to increase supplies through aquaculture (''fish farming'').

Options for Action

Trade and the use of technology have become important issues in the debate on sustainable development of marine resources, specifically whether the use of safe technology should be a condition of trade. Biodegradable nets, for example, prevent ''ghost fishing'' when nets are lost. Recently, Mexico presented a claim to the General Agreement on Tariffs and Trade (GATT) that the principle of free trade had been violated by the United States ban on imports of tuna from Mexico on the grounds that its ships were killing dolphins in their nets. GATT disallowed the American ban. It is expected that the debate will continue at the Earth Summit.

Ways need to be found to encourage and protect traditional, small-scale fishing, particularly in developing countries. The economic and environmental value of techniques used by indigenous peoples and the significant role of women in harvesting, processing and marketing local catches must be emphasized. Discussions at the Summit will probably focus on international assistance in supporting local fishing and facilitating the transfer of appropriate technologies to women.

Several small-scale projects are under way. In coastal regions of the Philippines, UN agencies are studying sea-farming to determine whether the negative effects of aquaculture can be counterproductive. For example, new species can upset the natural balance. They may become predators or even alter the genetic make-up of indigenous species.

Mangrove swamps have been destroyed to make room for fish ponds, often with disastrous results during subsequent storms. Wetlands converted to aquaculture have destroyed shrimping grounds. New sources of fish and seafood are necessary, but how to provide them on an environmentally and economically sustainable basis is a major question on the Summit's agenda.

Global Interdependence

Oceans, which cover twice as much of the Earth's surface as does land, play a crucial role in global climate and weather systems. Marine plants create and replenish the air that we breathe. Changes in ocean temperatures, the volume and quality of the waters and wave size have a profound effect on the planet's life-support systems.

The uncertain impact of global warming and the depletion of the ozone layer, and how these are connected to other complex global processes, are on the Conference agenda. Coastal areas and, in some cases, whole countries—including small island States and parts of the Netherlands—will disappear if global warming results in rising sea-levels, as many predict it will.

Various UN organizations, such as UNEP, the International Oceanographic Commission and the World Meteorological Organization, have suggested that a global ocean observation system be set up to improve the collection of information on environmental conditions.

That will take money, as will the building of sewage treatment plants and port reception facilities. It is on this point that the debate will be sharpest between proponents of private versus public responsibility, between aid donors and aid recipients, between polluters and victims. The terms of the compromises reached will determine the effectiveness of all the actions to follow.

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